Module 10: Classification - Diversity in the Six Kingdoms
Topic 3 Content: Invertebrates Notes

Introduction

Invertebrates

Click ***NEXT*** to begin.

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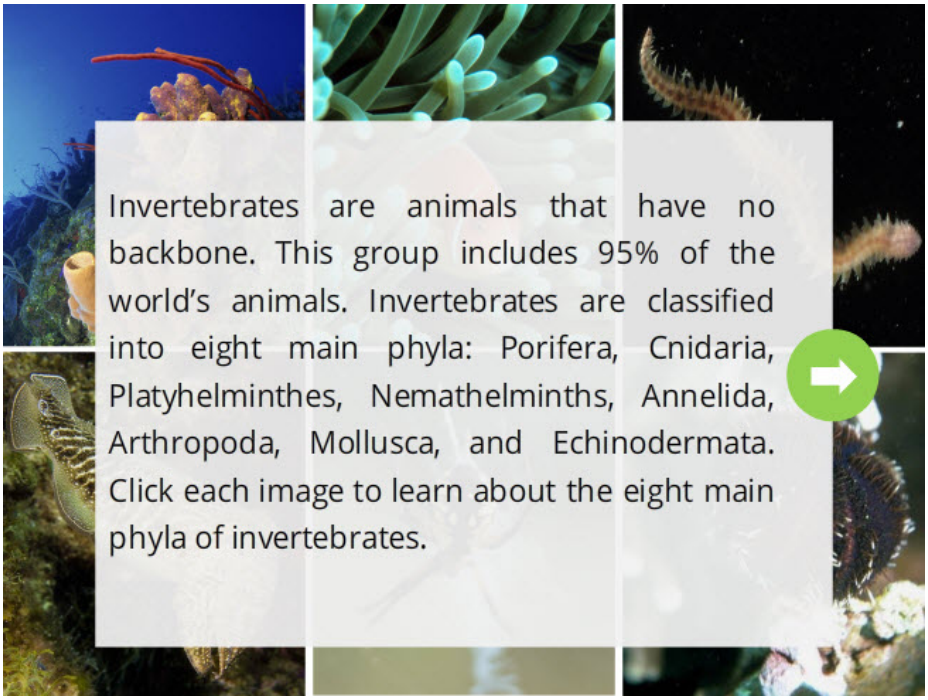
Instructions



Invertebrates are animals that have no backbone. This group includes 95% of the world's animals. Invertebrates are classified into eight main phyla: Porifera, Cnidaria, Platyhelminthes, Nemathelminths, Annelida, Arthropoda, Mollusca, and Echinodermata. Click each image to learn about the eight main phyla of invertebrates.

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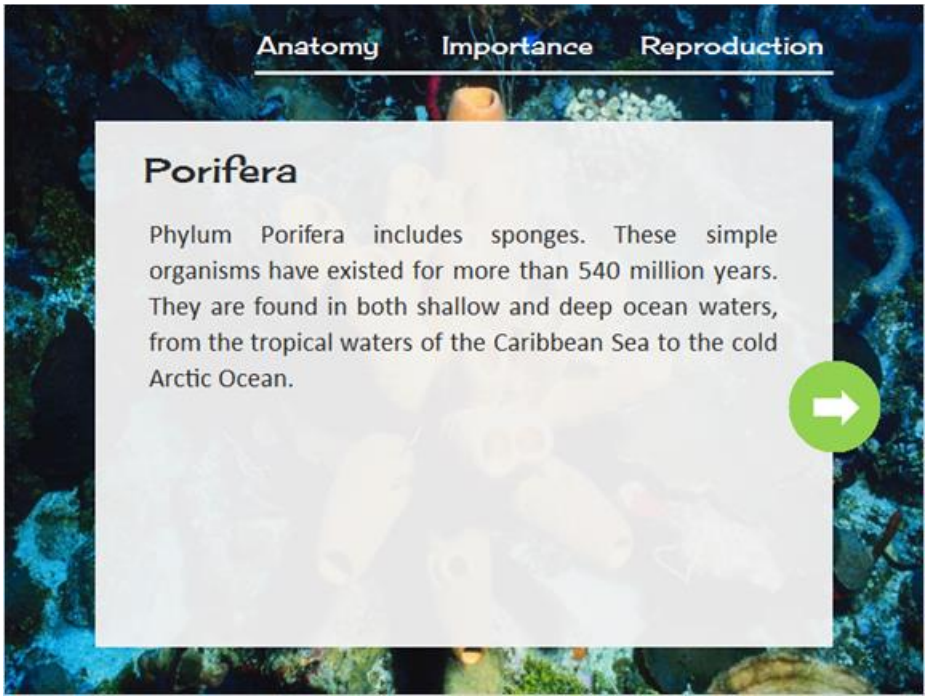
Porifera



Phylum Porifera includes sponges. These simple organisms have existed for more than 540 million years. They are found in both shallow and deep ocean waters, from the tropical waters of the Caribbean Sea to the cold Arctic Ocean.

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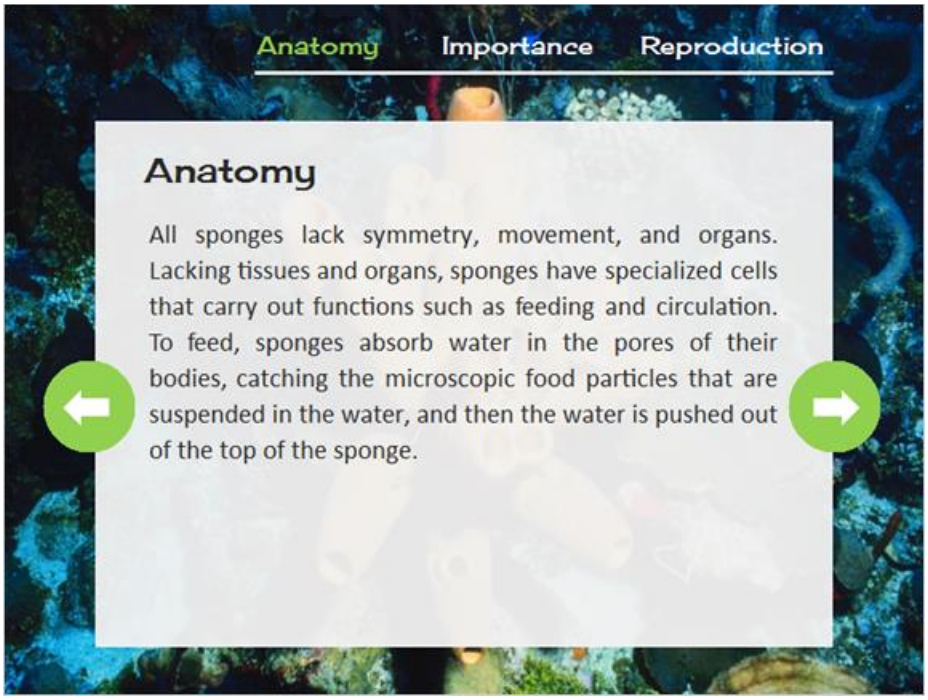
Anatomy

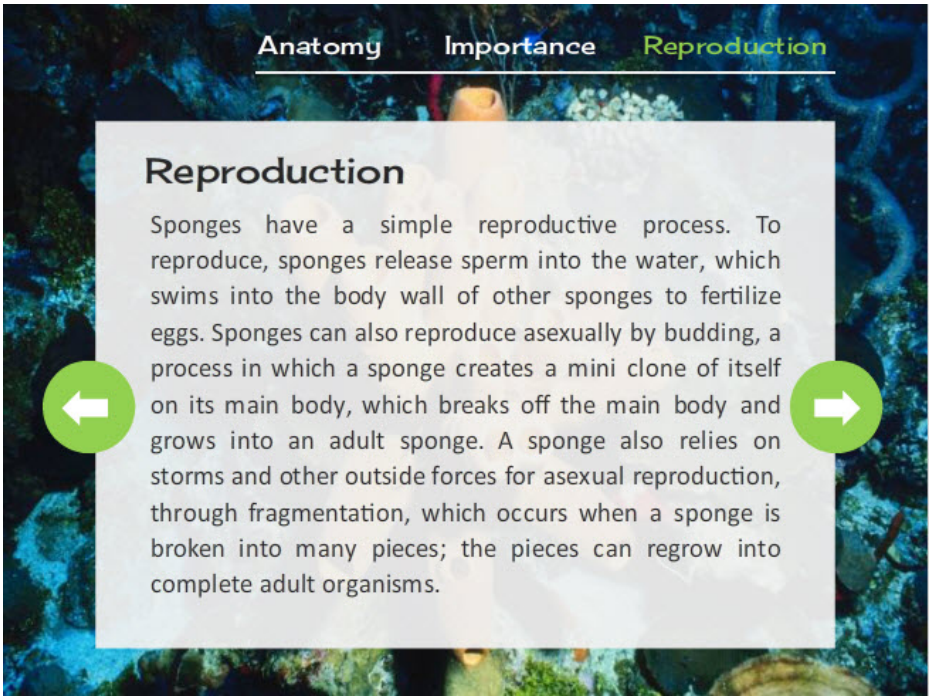


All sponges lack symmetry, movement, and organs. Lacking tissues and organs, sponges have specialized cells that carry out functions such as feeding and circulation. To feed, sponges absorb water in the pores of their bodies, catching the microscopic food particles that are suspended in the water, and then the water is pushed out of the top of the sponge.

Importance

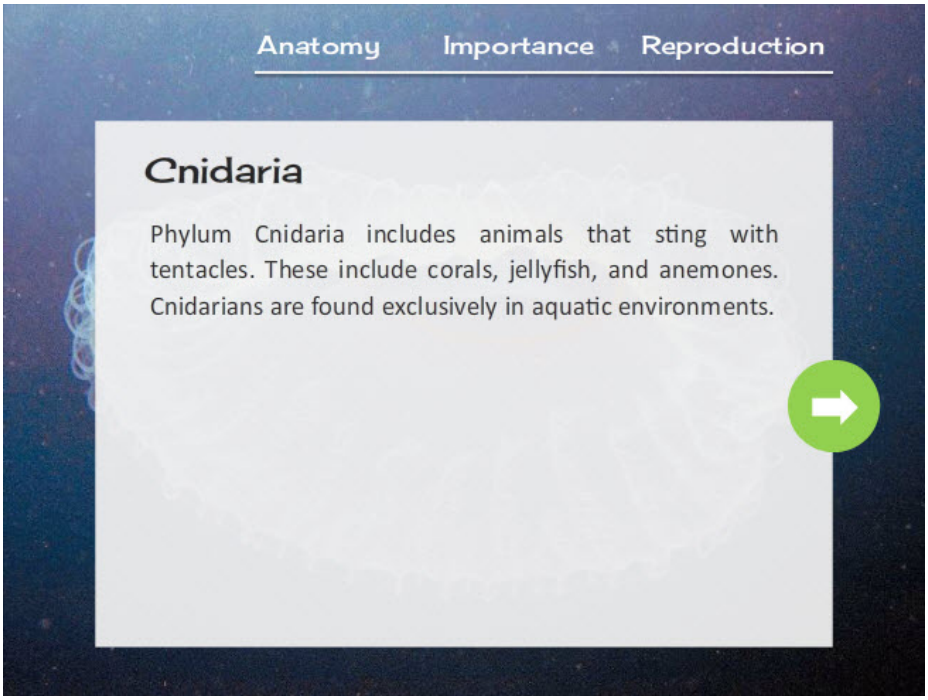
Sponges are important because of their role in recycling nutrients. Sponges break down complex organic material into a food source for other organisms in the environment.

Reproduction



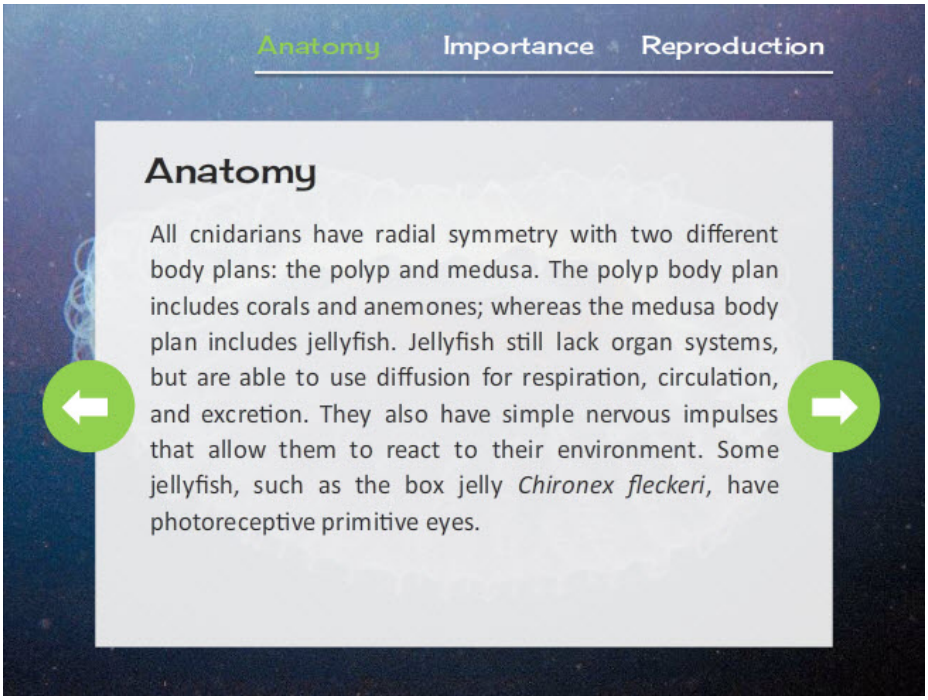
Sponges have a simple reproductive process. To reproduce, sponges release sperm into the water, which swims into the body wall of other sponges to fertilize eggs. Sponges can also reproduce asexually by budding, a process in which a sponge creates a mini clone of itself on its main body, which breaks off the main body and grows into an adult sponge. A sponge also relies on storms and other outside forces for asexual reproduction, through fragmentation, which occurs when a sponge is broken into many pieces; the pieces can regrow into complete adult organisms.

Cnidaria



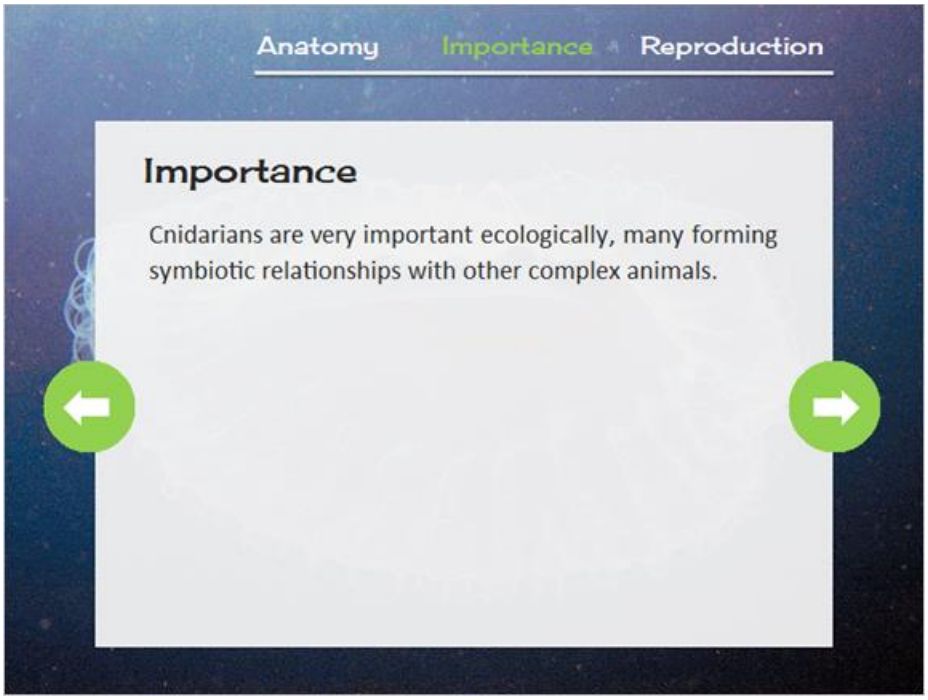
Phylum Cnidaria includes animals that sting with tentacles. These include corals, jellyfish, and anemones. Cnidarians are found exclusively in aquatic environments.

Anatomy



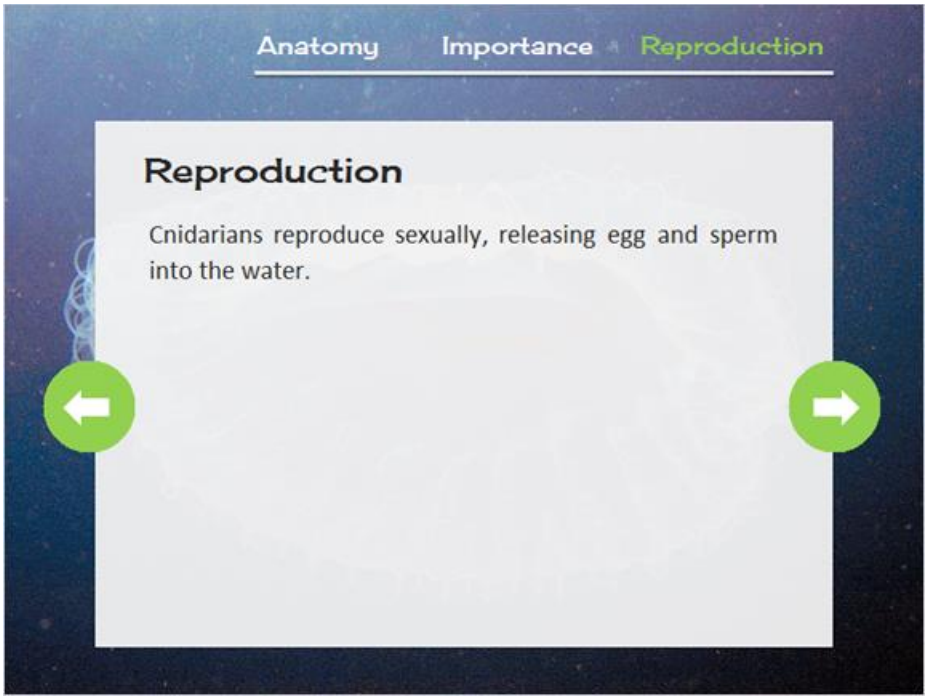
All cnidarians have radial symmetry with two different body plans: the polyp and medusa. The polyp body plan includes corals and anemones; whereas the medusa body plan includes jellyfish. Jellyfish still lack organ systems, but are able to use diffusion for respiration, circulation, and excretion. They also have simple nervous impulses that allow them to react to their environment. Some jellyfish, such as the box jelly *Chironex fleckeri*, have photoreceptive primitive eyes.

Importance



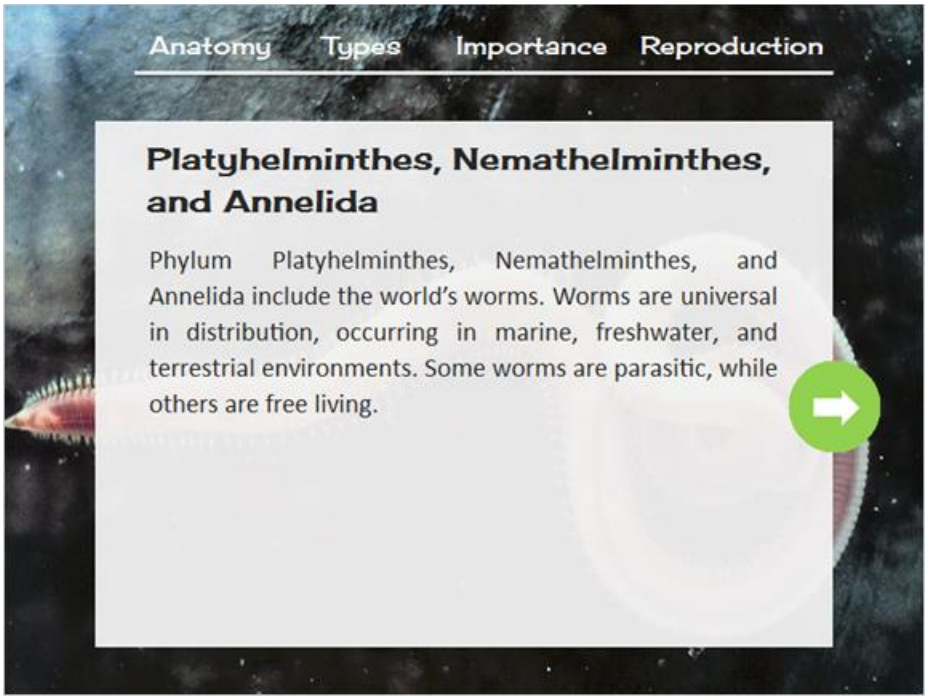
Cnidarians are very important ecologically, many forming symbiotic relationships with other complex animals.

Reproduction



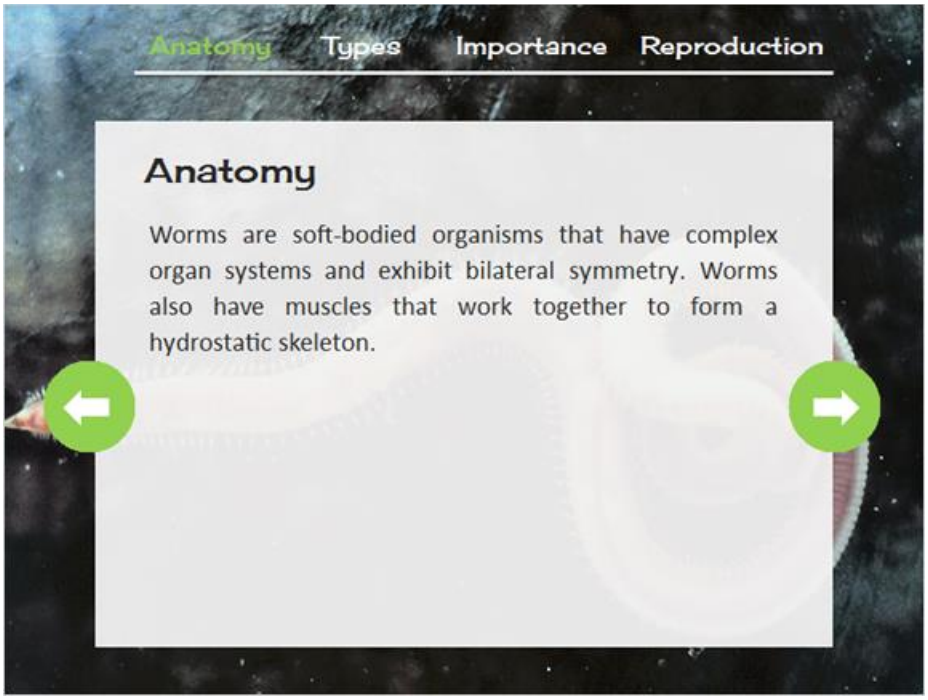
Cnidarians reproduce sexually, releasing egg and sperm into the water.

Platyhelminthes, Nemathelminthes, and Annelida



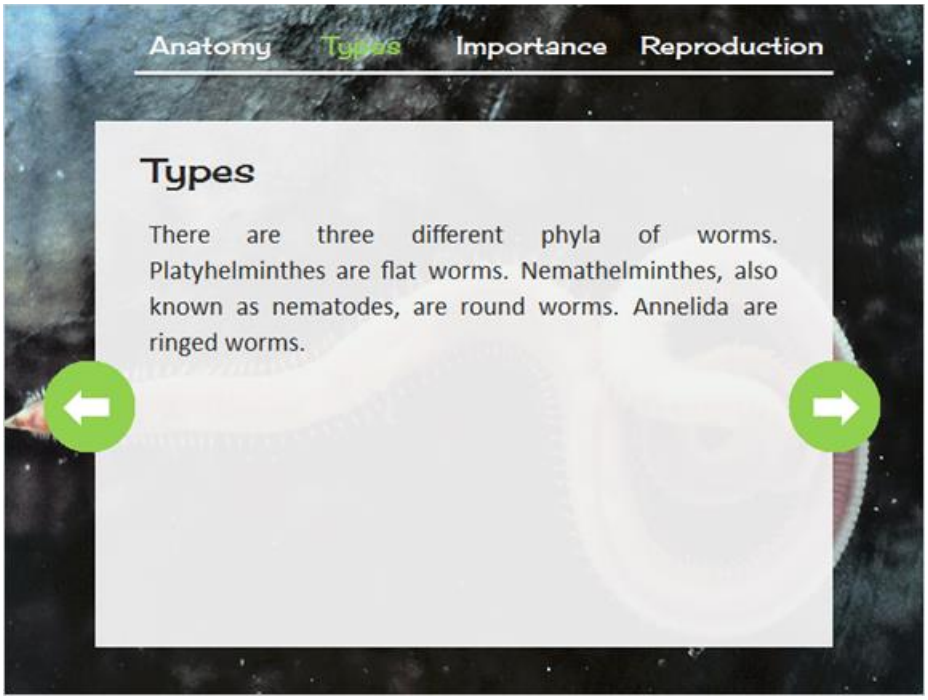
Phylum Platyhelminthes, Nemathelminthes, and Annelida include the world's worms. Worms are universal in distribution, occurring in marine, freshwater, and terrestrial environments. Some worms are parasitic, while others are free living.

Anatomy



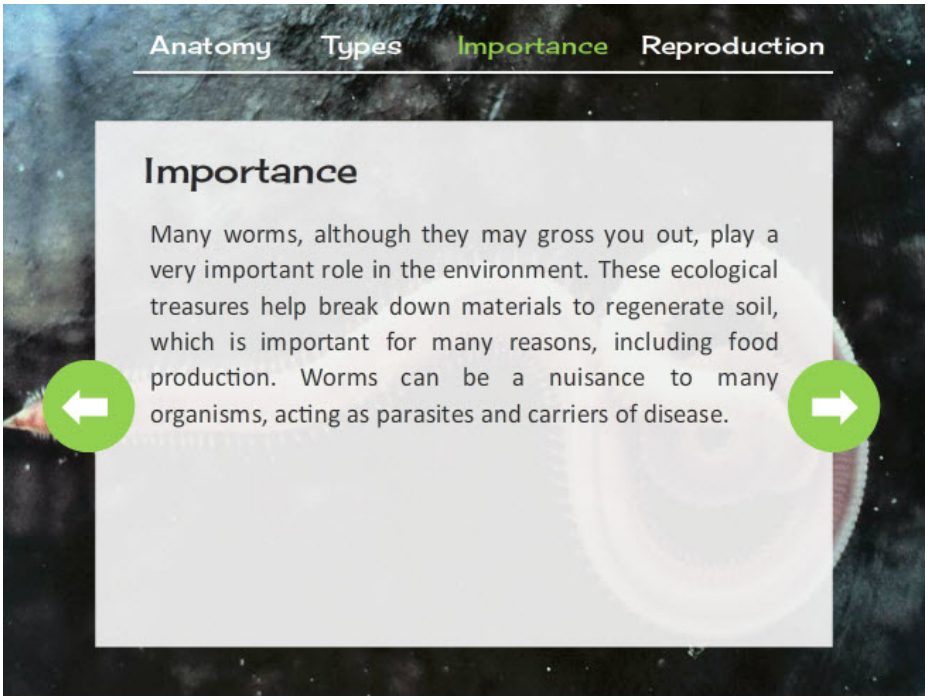
Worms are soft-bodied organisms that have complex organ systems and exhibit bilateral symmetry. Worms also have muscles that work together to form a hydrostatic skeleton.

Types



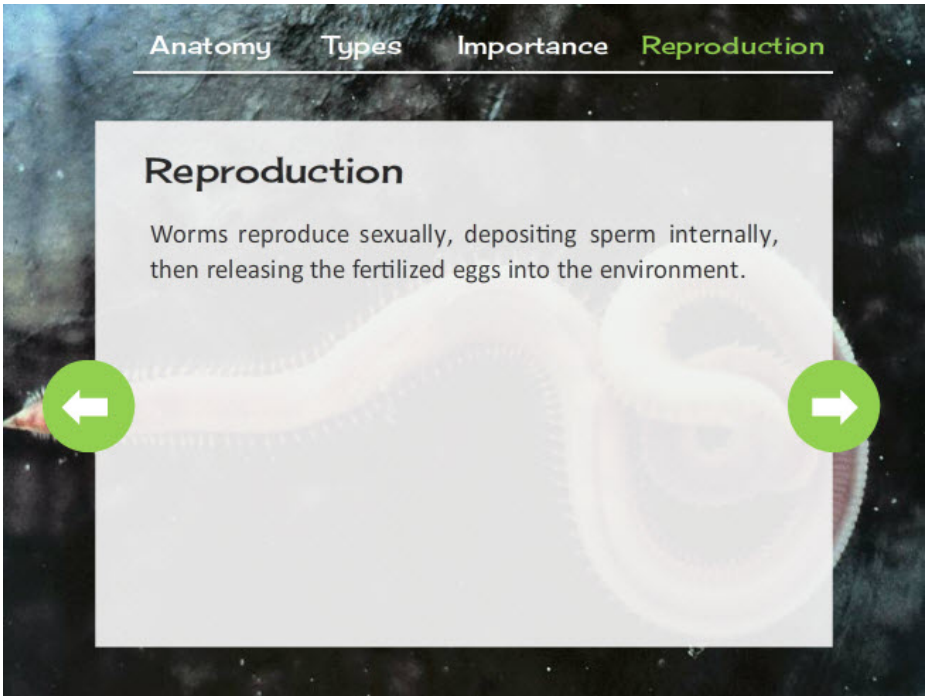
There are three different phyla of worms. Platyhelminthes are flat worms. Nemathelminthes, also known as nematodes, are round worms. Annelida are ringed worms.

Importance



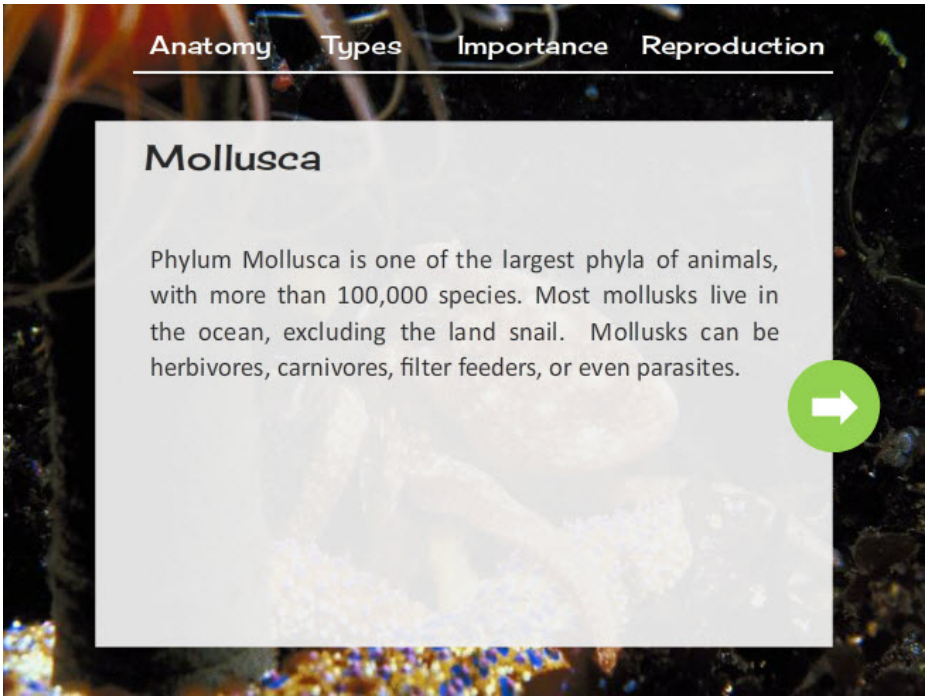
Many worms, although they may gross you out, play a very important role in the environment. These ecological treasures help break down materials to regenerate soil, which is important for many reasons, including food production. Worms can be a nuisance to many organisms, acting as parasites and carriers of disease.

Reproduction



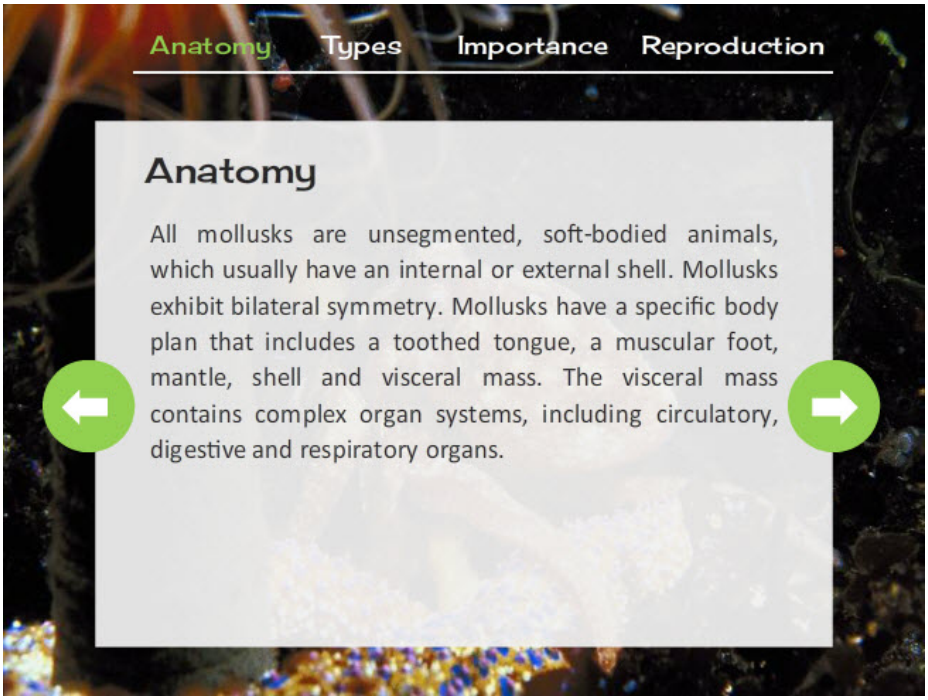
Worms reproduce sexually, depositing sperm internally, then releasing the fertilized eggs into the environment.

Mollusca



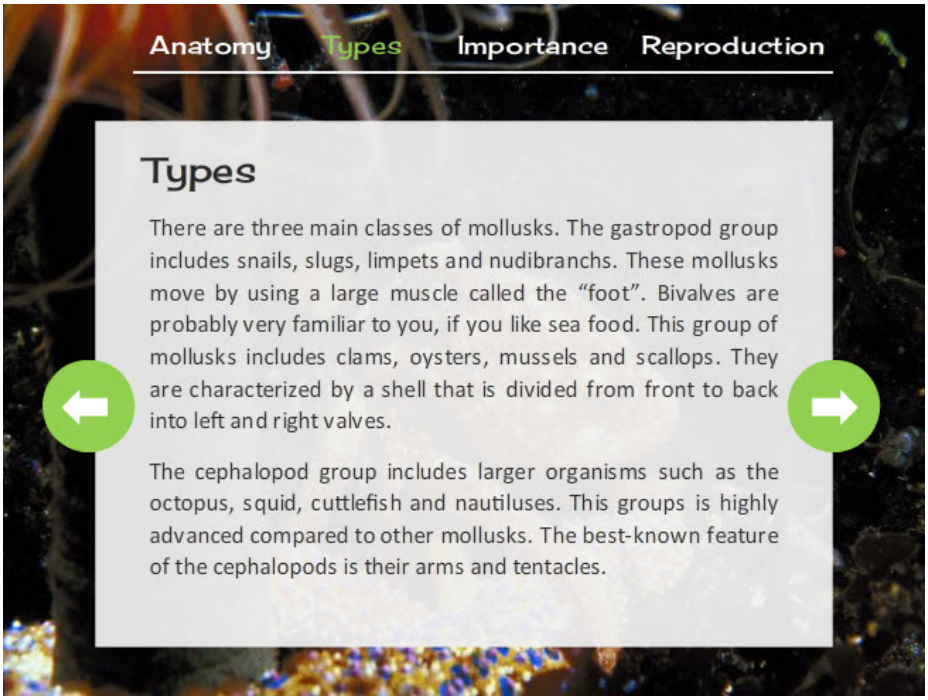
Phylum Mollusca is one of the largest phyla of animals, with more than 100,000 species. Most mollusks live in the ocean, excluding the land snail. Mollusks can be herbivores, carnivores, filter feeders, or even parasites.

Anatomy



All mollusks are unsegmented, soft-bodied animals, which usually have an internal or external shell. Mollusks exhibit bilateral symmetry. Mollusks have a specific body plan that includes a toothed tongue, a muscular foot, mantle, shell and visceral mass. The visceral mass contains complex organ systems, including circulatory, digestive and respiratory organs.

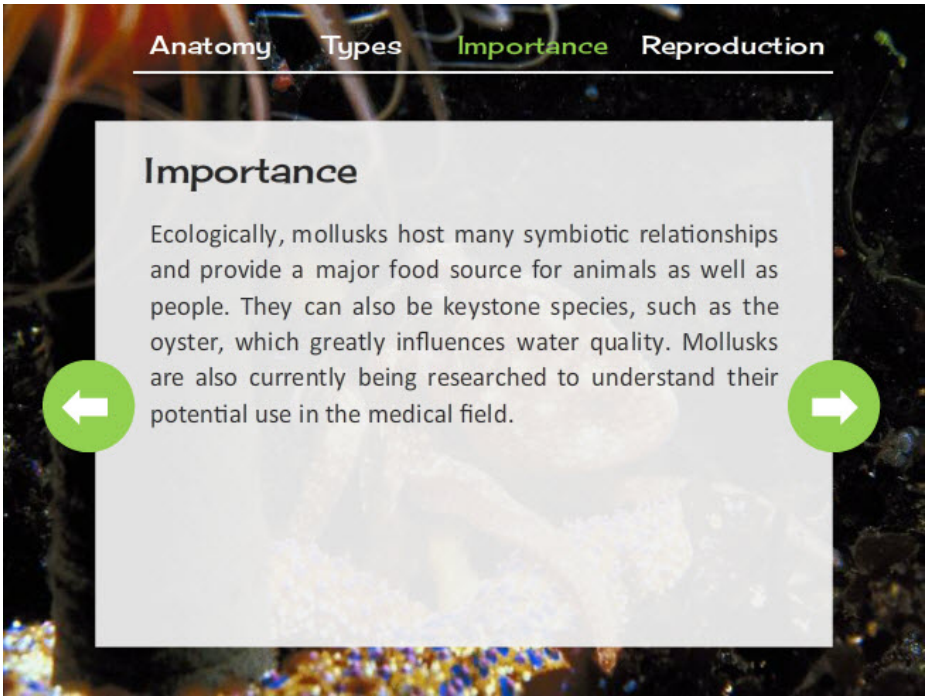
Types



There are three main classes of mollusks. The gastropod group includes snails, slugs, limpets and nudibranchs. These mollusks move by using a large muscle called the "foot". Bivalves are probably very familiar to you, if you like sea food. This group of mollusks includes clams, oysters, mussels and scallops. They are characterized by a shell that is divided from front to back into left and right valves.

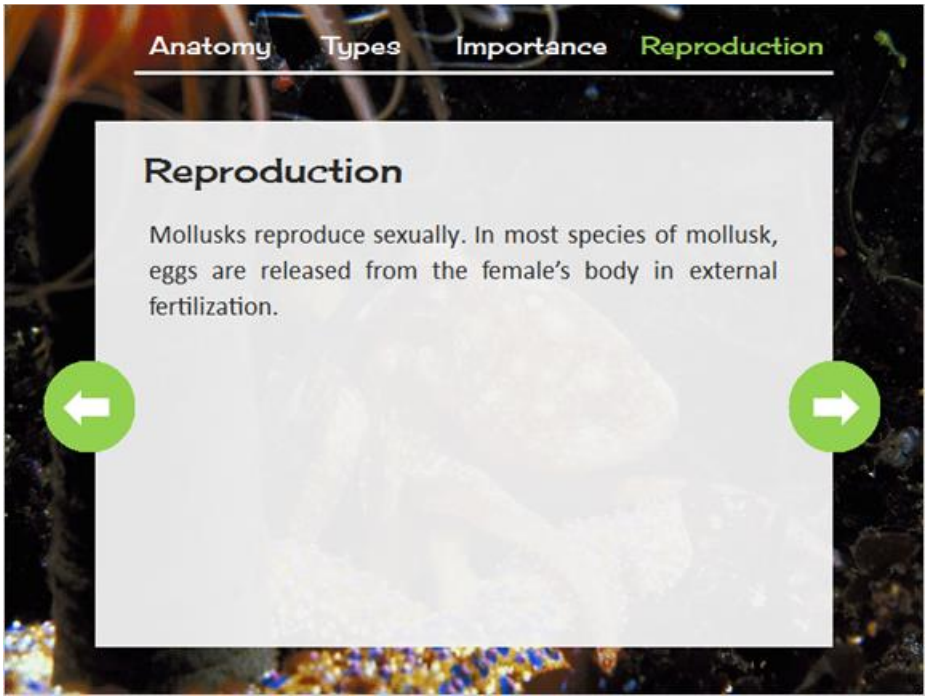
The cephalopod group includes larger organisms such as the octopus, squid, cuttlefish and nautiluses. This groups is highly advanced compared to other mollusks. The best-known feature of the cephalopods is their arms and tentacles.

Importance



Ecologically, mollusks host many symbiotic relationships and provide a major food source for animals as well as people. They can also be keystone species, such as the oyster, which greatly influences water quality. Mollusks are also currently being researched to understand their potential use in the medical field.

Reproduction



Mollusks reproduce sexually. In most species of mollusk, eggs are released from the female's body in external fertilization.

Arthropoda

The largest group of all the animals is the mighty phylum Arthropoda. This phylum includes three times the number of all other animal species combined. Arthropods include an extremely diverse group of all of the crustaceans, spiders and insects of the world, including herbivores, carnivores, omnivores, detritivores, and parasites.

Anatomy

All arthropods have a segmented body, exoskeleton and jointed appendages. Arthropods have complex body systems, including all of the organ systems of the human body. Arthropods lack an internal skeleton, so they must shed their exoskeletons as they grow, a process known as molting.

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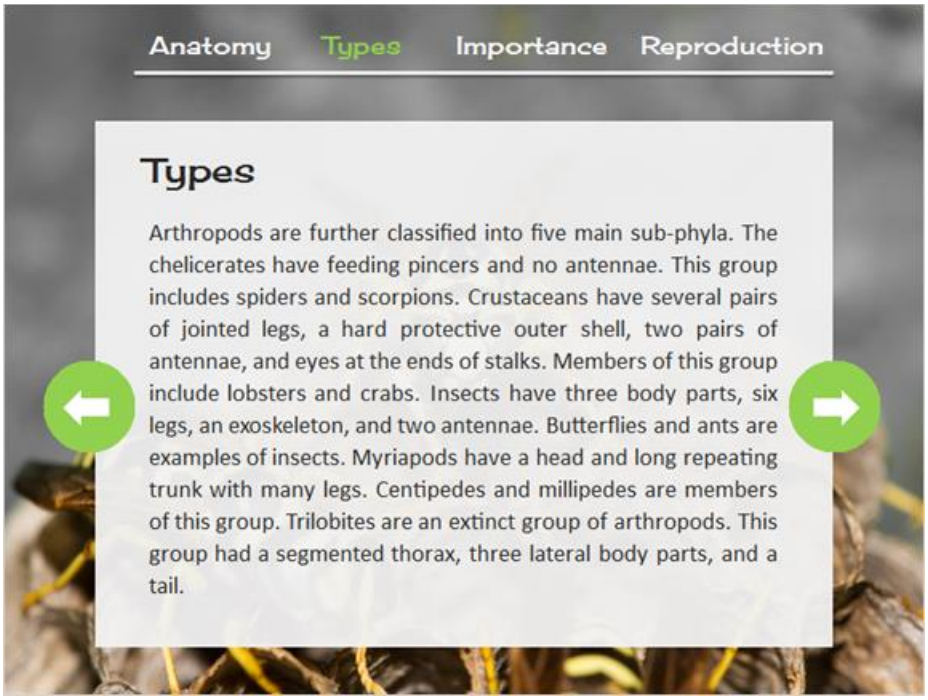
Types

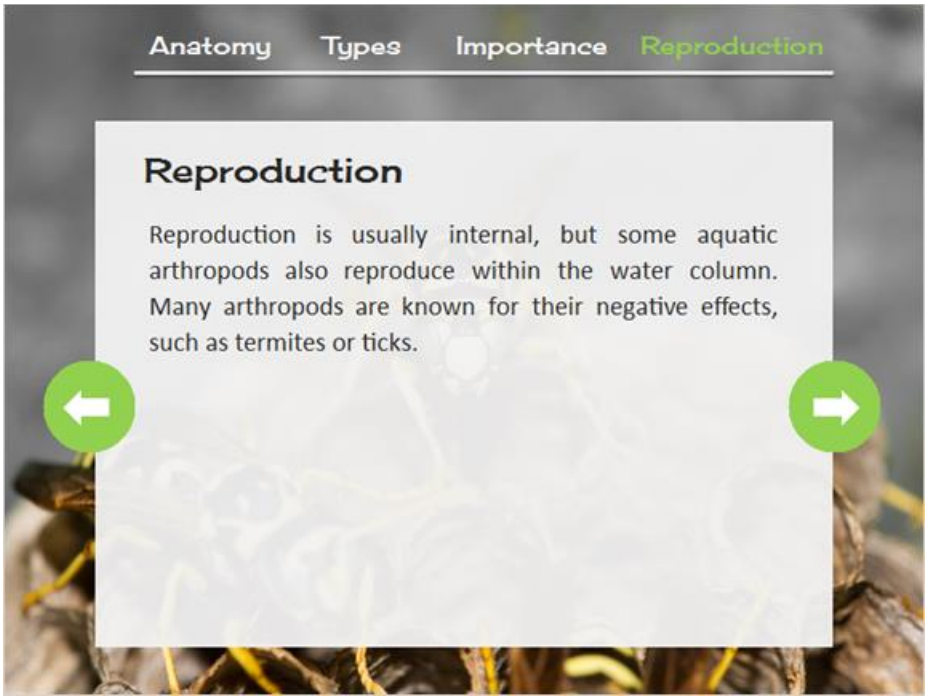


Arthropods are further classified into five main sub-phyla. The chelicerates have feeding pincers and no antennae. This group includes spiders and scorpions. Crustaceans have several pairs of jointed legs, a hard protective outer shell, two pairs of antennae, and eyes at the ends of stalks. Members of this group include lobsters and crabs. Insects have three body parts, six legs, an exoskeleton, and two antennae. Butterflies and ants are examples of insects. Myriapods have a head and long repeating trunk with many legs. Centipedes and millipedes are members of this group. Trilobites are an extinct group of arthropods. This group had a segmented thorax, three lateral body parts, and a tail.

Importance

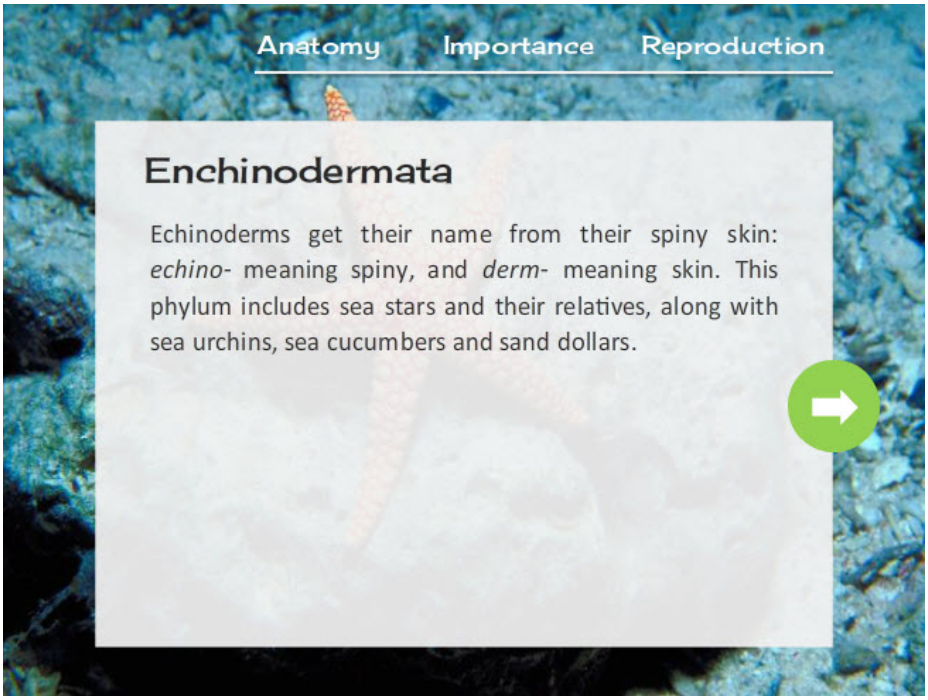
Despite their association with disease or destruction, arthropods are very ecologically important to our biosphere. Think about a world without pollinators, such as our bees and butterflies. Insects and crustaceans are also an important food source for humans in many parts of the world.

Reproduction



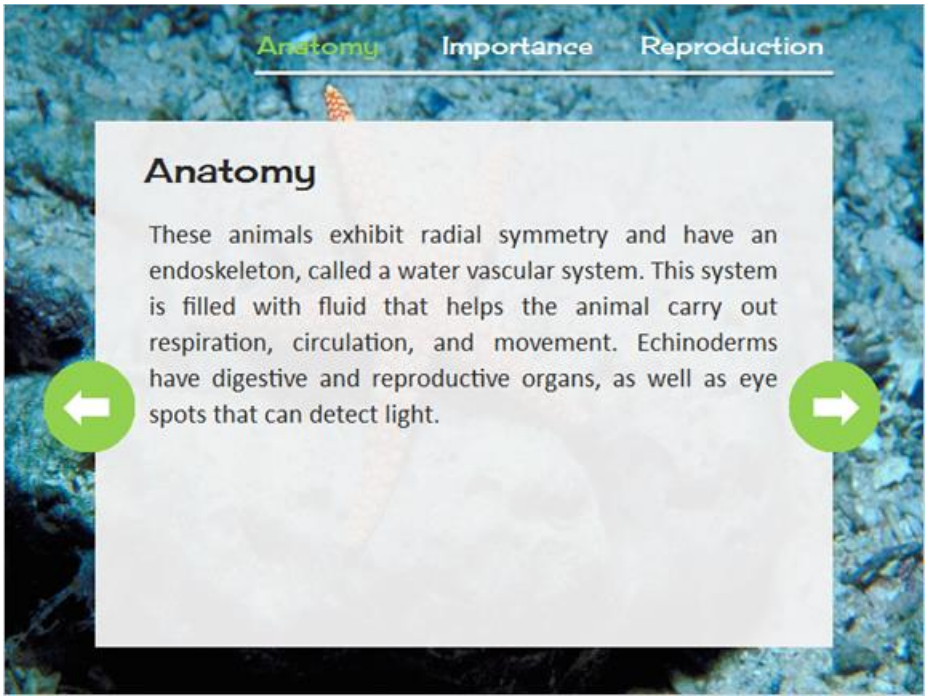
Reproduction is usually internal, but some aquatic arthropods also reproduce within the water column. Many arthropods are known for their negative effects, such as termites or ticks.

Echinodermata



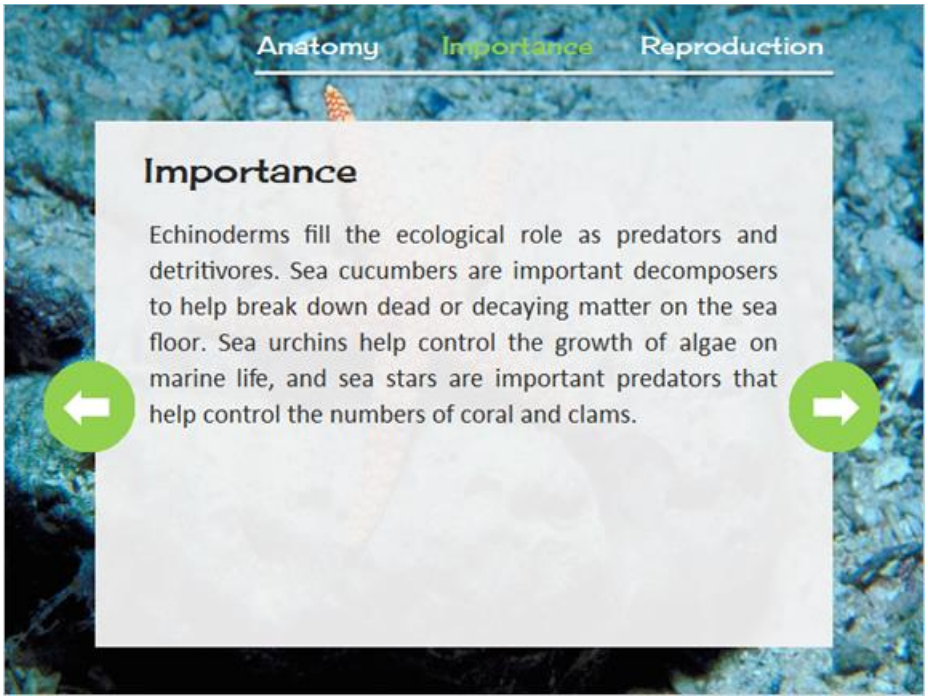
Echinoderms get their name from their spiny skin: *echino*- meaning spiny, and *derm*- meaning skin. This phylum includes sea stars and their relatives, along with sea urchins, sea cucumbers and sand dollars.

Anatomy



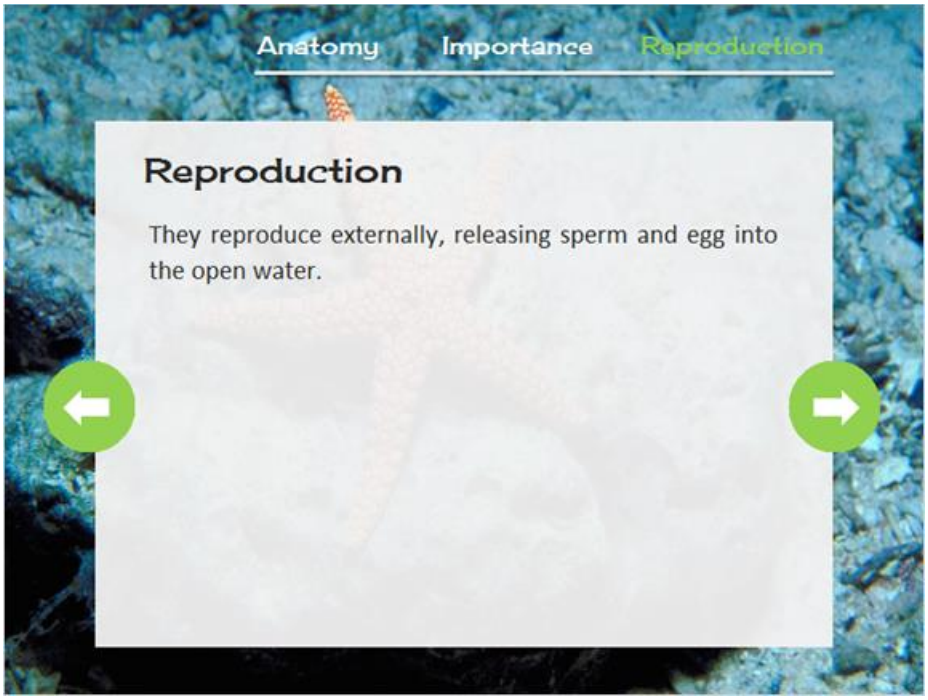
These animals exhibit radial symmetry and have an endoskeleton, called a water vascular system. This system is filled with fluid that helps the animal carry out respiration, circulation, and movement. Echinoderms have digestive and reproductive organs, as well as eye spots that can detect light.

Importance



Echinoderms fill the ecological role as predators and detritivores. Sea cucumbers are important decomposers to help break down dead or decaying matter on the sea floor. Sea urchins help control the growth of algae on marine life, and sea stars are important predators that help control the numbers of coral and clams.

Reproduction



They reproduce externally, releasing sperm and egg into the open water.